MR. W. W. RUNDELL.

A LARGE circle connected with the British Mercantile Marine, besides many others interested in magnetic science, will regret to learn that W. W. Rundell, so long associated with Liverpool and its nautical affairs, died a few weeks ago at the advanced age of eighty-one.

We first hear of Rundell in 1845, when he became Secretary of the Cornwall Polytechnic Society, a post which he held until 1855, when he was appointed Secretary of the Liverpool Compass Committee.

It will be remembered that this Committee sat during the years 1855–57, and by 1860 had made three reports to the Board of Trade on the magnetism of a majority of the iron ships leaving the port of Liverpool, the necessary compensations to be made for the resulting deviations of ship's compasses, and the proper equipment and placing of such compasses. This was a work of the highest importance at a time when iron ships were rapidly increasing in numbers, and much danger existed in their navigation from the ignorance which prevailed on the subject.

To Rundell was entrusted the details of the experimental investigations, and the keeping the necessary records of proceedings, an onerous post which he occupied with great zeal and marked perception in reducing and coordinating a mass of results, often of an apparently contradictory nature.

In the spring of 1857 the Liverpool Compass Committee was dissolved, and Rundell was appointed Secretary of the Underwriters' Association of Liverpool; but for the succeeding three and a half years he worked during his leisure hours at the preparation of the valuable third Report of the Liverpool Compass Committee, and this altogether as an honorary task.

Although in many questions relating to the magnetism of ships he was ready to work cordially with Smith and Evans, who were then carrying on an important work connected with the magnetism of ships in the Royal Navy, Rundell had one important difference of opinion with them—as regards the mechanical correction of compasses.

Smith and Evans objected strongly to compensating the standard compasses of ships by magnets and soft iron, advocating reliance upon deviation tables for correcting the compass courses steered. Rundell, supported by his friend Towson, insisted on the complete compensation of compass errors, so strongly advocated by Airy the inventor of the methods of doing so. The Mercantile Navy followed him, and he has lived to see the Royal Navy more bent on rigorous compensation than the Mercantile.

In 1862 he contributed an excellent paper on compass equipment in iron ships to the Institution of Naval Architects, followed by another on the same subject in 1866. This latter paper contained a vigorous protest against Government supervision of merchant vessels as regards their compasses, and especially to placing the regulation of their equipment under the control of the Admiralty Compass Department, as proposed by the Royal Society to the Board of Trade, but declined by the Board.

Rundell, however, did not content himself with a protest, but made some excellent propositions, which for the most part have been adopted by the Board of Trade.

Zealous and painstaking in whatever he undertook, firm in any position which his well-balanced mind caused him to take up, Rundell was of a kindly disposition and surrounded by friends, many of whom he has survived. He has left an indelible mark on the service to the benefit of which so many years of his life were devoted.

E. W. C.

NOTES

On Monday last, Lord Lister's professional brethren gave a visible sign of their high regard for him, and their appreciation of his work, by presenting his portrait, executed by Mr. W. W. Ouless, R.A., to the Royal College of Surgeons. In making the presentation on behalf of the subscribers, Mr. Davies Colley remarked that before long he hoped that those thousands who owed life and health to Lord Lister's discoveries would show their gratitude by founding some institution, or raising some great monument in his honour. There was, however, a special fitness in having a portrait painted of one who had done so much to advance the science of surgery, and placing the picture side by side with the portraits of John Hunter, Astley Cooper, and the other great surgeons who had done similar work. Sir William MacCormac, President of the College, in accepting the portrait, pointed out that a revelation in surgery, one of the most beneficent which has happened in our time, has been the result of Lister's patient investigation. It was not necessary to enter into details as to the incalculable benefit which has flowed from the application of antiseptic principles to surgery. Every surgeon must feel a debt of personal gratitude to the man who enabled operations in surgery to be practised with a safety and in a manner heretofore unknown. In the course of a brief reply, Lord Lister is reported by the *Times* to have said: "It would be affectation to deny that I feel this occasion to be one of extreme gratification. I cannot but be conscious that it is a very high personal honour and a remarkable token of esteem and kindly feeling on the part of my colleagues in the noble profession of surgery. But I confess I feel it still more gratifying as a remarkable indication of the general acceptance of the principles which I have for so long a time striven to establish and to promulgate. I am glad this meeting cannot be regarded in any sense as a mere meeting of congratulation on the distinction, great as I am bound to say I feel it to be, which it has pleased Her Majesty to confer upon me, because this project of a portrait was set going before that honour was thought of. This circumstance makes the occasion still more markedly a tribute to the truth and importance of antiseptic principles. Those principles are now more and more recognised throughout our profession, and with increasing benefit to mankind. I was reading only to-day a pamphlet which was sent to me by the author, Dr. Coaley, of New York. In it it was stated that in 360 antiseptic operations for the radical cure of hernia, only one death occurred, not caused apparently by the operation, but by the anæsthetic ether given to a child with weak lungs. An achievement like that is enough to cause gladness in the heart of any man who loves his fellow-men. And yet I cannot help remarking that such results could not have been obtained by the mere recognition of the truth or importance of antiseptic principles. Such success implied that the operator was not only convinced of the truth of those principles, but also that he vigilantly maintained throughout his operations that earnest care which is necessary to prevent those principles from being contravened."

Prof. Hermann Munk has been elected president of the Berlin Physiological Society, in succession to the late Prof. Du Bois Reymond.

The Swedish Academy of Agriculture of Stockholm has awarded its gold medal to Prof. J. Eriksson, for his researches on the rust of cereals.

A committee has been formed to collect international subscriptions for the erection of a memorial to the late Prof. Galileo Ferraris in the Royal Industrial Museum, Turin.

The Prussian Academy of Sciences has elected Prof. Erns Ehlers, Professor of Zoology in Göttingen University, and Prof. G. Darboux, the distinguished French mathematician, to be corresponding members.

The American Academy of Arts and Sciences have elected as foreign members: Prof. Ludwig Boltzmann, professor of theoretical physics at Vienna; Prof. W. Pfeffer, professor of botany at Leipzig; and Dr. W. Dörpfeld, secretary of the German Imperial Archæological Institute at Athens.

The Naturalists' Association of Danzig has offered a prize for the best treatise on the origin and spread of fungus epidemics among insects which are injurious to the forests in West Prussia, and for the best means of applying them to the destruction of the insects. The papers are to be sent in by December 31, 1898.

At the recent annual meeting of the Sanitary Institute, H.R.H. the Duke of Cambridge, K.G., was re-elected President. Prof. W. H. Corfield and Mr. Thomas Salt were elected new Vice-Presidents, to fill the vacancies caused by the death of Sir George M. Humphry and Sir J. Russell Reynolds.

Mr. A. A. C. Swinton will give a paper on recent investigations in connection with X-rays, at the Camera Club, on April 12, when he will show a number of experiments illustrative of the properties of kathode and X-rays, and will exhibit a new and improved form of Crookes' tube he has designed for practical work. This tube is capable of easy adjustment, so as to give X-rays of any desired penetrative value.

Dr. Nansen was enthusiastically received at the Paris Geographical Society on Friday last, when he gave an account of his polar explorations. M. Rambaud, Minister of Education, presided, and, before the lecture, invested Dr. Nansen with the insignia of Commander of the Legion of Honour. Dr. Nansen also received the gold medal of the Society, and a medal from the Municipality of Paris.

Persistent efforts are being made in France by the Commission officielle pour la division décimale du temps et de la circonférence, to secure the adhesion of scientific societies to the division of the hours of the day into 100 parts, each to be again subdivided into 100 parts. This method of dividing time has evident advantages, but it also has its inconveniences; for instance, the C.G.S. unit of time, officially adopted at the International Congress of Electricians in 1881, would have to be discarded. To obtain an opinion upon the proposed decimal division of time, the Société Française de Physique has sent out a circular to its members, and has appointed a committee to consider the replies received, and to advise therefrom as to the action the Society should take.

The United States Government in 1895 appointed a "Deep Water-Ways Commission," for the purpose of making a preliminary investigation of the possibility of opening a deep waterway from the great lakes to the sea. This Commission has now reported that it is quite practicable to construct such canals as will be adequate to any scale of navigation that may be required between the great lakes and the sea; and recommend that the depth of any water-ways so constructed, should not be less than 20 feet. They also find that the most eligible route, starting from the heads of Lake Michigan and Superior, is through the several lakes and the proposed Niagara ship canal to Lake Ontario; and that the Canadian sea-board may be reached from Lake Ontario by way of the St. Lawrence; and the American sea-board by way of the St. Lawrence, and Lake Champlain, and the Hudson river; or by way of the Oswego-Oneida, Mohawk valley, and the Hudson river. They recommend that the Niagara ship canal should be first commenced, and that the other works required should be pushed on with as quickly as the projects can be matured; and that further surveys be undertaken, estimates of the cost prepared, and a systematic measurement of the outflow of the lakes undertaken. The cost of these investigations is estimated at about 126,000*l.*, and it will require two or three years to complete them. The President, in sending the report to Congress, advised that provision be made for carrying on the work of preliminary examination. The Canadian Government has also appointed a Commission to look into the question, and a joint session of the two Commissions was held at Detroit in last year.

The advantages of the absolute system of electric units have led Prof. Leonhard Weber to propose a similar system of units for photometric purposes. In the *Elektrotechnische Zeitschrift*, Prof. Weber points out that in photometry we have to deal with six different quantities, viz. intensity of light, flux of light, quantity of light, illumination, brightness and time-integral of illumination. Taking a *candle* as the unit of intensity, he shows how all these quantities can be expressed in terms of the candle, centimetre and second; or the candle, metre and hour. The objection to this proposed system, to our mind, is the adoption of a candle as one of the fundamental units; in order to obtain a perfectly absolute system of units, quantity of light should be measured in terms of the energy radiated, and the unit of intensity would then be that of a source from which the amount of energy radiating per unit solid angle per second was one erg. This would reduce all photometric quantities to the C.G.S. system of units.

Prof. A. Gray writes, with reference to his article in Nature of last week, that Lord Kelvin has called his attention to the fact that the account of Lord Kelvin's telephone-line and the establishment of telephony in Glasgow, is not quite exact. The telephone-line to Lord Kelvin's instrument-makers' was only one, and no doubt an early one, of a number of separate or independent lines which were established in Glasgow, and in other places, soon after the introduction of the telephone to this country by Prof. Graham Bell.

Messrs. Allen and Chapman, of New York, have just issued (extracted from the *Bulletin* of the American Museum of Natural History) an article on the "Mammals of Yucatan," where Mr. Chapman has lately made a brief stay. This dry and sparsely-wooded country has by no means a rich mammal-fauna; but during his short visit Mr. Chapman was able to secure examples of fifteen species, amongst which two or three rodents are described as new.

Messrs. Allen and Chapman also send us (extracted from the same periodical) an article on a collection of mammals made by Mr. Chapman, in Trinidad, during his trip to that island in 1894. The total number of mammals now recognised by the authors as found in Trinidad is about sixty-five species, of which forty are represented in the present collection. Of these a bat and three small rodents are referred to new species. Unfortunately, under the guise of priority, the American zoologists introduce so many new names into their recent works, that it is, in many cases, very difficult for their old-fashioned brethren of Europe to understand what they mean by them.

The latest contribution to the interesting subject of the primitive wild cattle of Europe is a short illustrated article, by Dr. A. Nehring, on Anton Wied's "Muscovia," a famous publication o. the sixteenth century, in which a very incorrect figure of the urus was depicted. In the German edition of this work, by Herberstain, published in Vienna in 1557, characteristic figures are given of the European bison or wisent (*Bison europæus*) and of the urus (*Bos primigenius*); but the best illustration of the latter known to Prof. Nehring is that of a clever unknown artist of the first quarter of the sixteenth century, which was copied in

Griffiths' "Animal Kingdom," London, 1827 (vol. iv. p. 411). The above-mentioned illustrations are reproduced in Dr. Nehring's paper in *Globus*, Bd. lxxi. p. 85.

THE *Annalen der Hydrographie und maritimen Meteorologie* or February, issued by the Deutsche Seewarte, contains a discussion of the storms of the western part of the South Atlantic Ocean, by E. Knipping, based upon the observations of 252 storms, mostly reported in the logs of German vessels. In higher latitudes than 30° S. only storms of hurricane force (11 and 12 of the Beaufort wind-scale), and in latitudes below 30° S. all storms of force 8 are included. The results show that no storm occurred to the east of 27° W. long. and north of 29° S. lat. The yearly distribution westward of 25° W. long. is very marked; for one storm in summer there are five in winter. The months of November to March are free from storms below 30° S. lat.; stormy trade-winds occur as far as 28° S., but only from April to October, and mostly with high and somewhat steady air-pressure. From 25° to 40° S. storms occur more frequently within a distance of 500 miles from the coast than beyond that area. In north-easterly storms the mean change of wind direction over the whole district amounts to 8 or 10 points of the compass in a left-hand direction, while in south-westerly storms there is little or no change of direction. In north-west storms below 30° S. there is little or no change, while above that latitude it amounts to 4 or 6 points to the left. The mean duration increases with the latitude; from 20° to 30° S. the north-easterly storms last twice as long, and from 30° to 40° S. only half as long as storms from other directions. The greatest force of the storms generally occurs with a rising barometer, *i.e. after* the time of the lowest reading, except in the case of easterly storms, when it occurs as frequently with a falling as with a rising barometer.

IN May 1895, Mr. W. E. Wilson read a preliminary paper before the Royal Society, in which he described the apparatus and results of his investigation of the effect of pressure in the surrounding gas on the temperature of the crater of an electric arc. It may be remembered that the chief aim of the research was to determine, if possible, whether the temperature of the crater in the positive carbon varies when the pressure in the surrounding gas is changed. In a more recent investigation (*Astrophysical Journal*, vol. v. No. 2, p. 101), Messrs. Wilson and Fitzgerald give the results of further work on these points. These may be briefly summed up as follows:—That more evidence than they have obtained must be procured before they are able to affirm that either the temperature of the crater of the arc is raised or lowered by pressure. They, however, made some very concordant observations, which showed that the temperature was lowered with pressure, and in which at the time they could see no evidence of absorption by fog; but then, at other times, there were undoubted cases of absorption. "We certainly got no evidence that there is an appreciable increase of temperature." The best observations, the authors further say, "were made with variations of pressure from 15 up to 100 pounds per square inch, and there seems very little evidence of much change of radiation with this change of from 1 up to between 6 and 7 atmospheres."

REMARKING on these interesting researches of Mr. Wilson, M. Guillaume writes that they seem to have shown that the temperature of the crater in the positive carbon is not limited to the boiling of carbon. Referring to the early researches of MM. Hannay and Hogarth (*Proc. R.S.*, vol. xxx. p. 178), and taking into account the recent investigation of M. P. Villard (*Journal de Physique*, vol. v. p. 453, 1896), M. Guillaume presented to the Physical Society of France, on July 20, 1896, the essence of a theory of the arc under pressure, based on the "dissolution du carbone dans le gaz ambiant." This idea seems to be in perfect harmony with the experiences of Violle, Wilson and Villard; and the fact observed by Wilson and Fitzgerald, that they "found that whenever the pressure was suddenly reduced there was a fog formed in the box, which cut off the light enormously," speaks well, as M. Guillaume says, for the accuracy of his theory. The temperature of carbon seems to be limited by the rapidity of the "dissolution" in the surrounding atmosphere, and ought to decrease when the pressure increases.

MR. ASA S. KINNEY has made a number of experiments for the purpose of obtaining some definite knowledge as to the influence of electricity upon plants, and his investigation forms the subject of *Bulletin* No. 43 of the Hatch Experiment Station of the Massachusetts College. The current employed was in some cases produced by four Leclanché cells, and in others by a Samson cell giving an electro-motive force of two and eighty-eight hundredth volts. An induction coil was used, so as to obtain a large variation in electro-motive force. The stimulation thus provided was applied to moistened seeds in glass jars, and upon filter papers. So far as the experiments go, they show that electricity exerts an appreciable influence upon the germination of seeds, the application of certain strengths of current to seeds for short periods of time apparently accelerating the processes of germination. As a result of experiment, it was found that at the end of twenty-four hours over 30 per cent. more seeds were germinated in the treated lots than in the normal. The range in the strength of current which accelerated germination seems to be exceedingly limited. The minimum strength of current, which just perceptibly accelerated germination when an interrupted induced current was used, probably represented considerably less than one volt. The optimum strength of current, which showed the maximum growth of radicles and hypocotyls, was equal to about three volts where an interrupted induced current was used. The maximum current which the seed germ could withstand without being destroyed was not ascertained, but it probably represents a comparatively high voltage. Arrangements were made to send an hourly current through the germinating seeds and growing plants, and it was found that the electricity did not lose its effect, but acted as a constant stimulation to their growth and development. The seeds used were of white mustard, red clover, rape, and barley, and measurements were made of about three thousand roots, and nearly one thousand stems.

DR. W. A. SOGA and Mr. H. Percy Browne have recently made some very important tests of the value of a certain fungus for destroying locusts by infecting them with it. The fungus is prepared by Dr. Edington, of the Bacteriological Institute, Grahamstown, and, judging from the experiments described in the Cape *Agricultural Journal*, great benefits may be expected to be derived by using it to infect locust swarms. A few locusts are caught and treated with the fungus; they are then set free, and inoculate other members of the swarm, with the result that in a few days the locusts die in large numbers.

THE Summary Report for 1896 of the Geological Survey of Canada affords very interesting reading. The year has been marked by a notable development in mining, and by a remarkable discovery of corundum in a pegmatite in Ontario. The deep boring at Athabasca, described in the two last reports, has had to be abandoned after nearly 2000 feet of Cretaceous rocks had been sunk through, without the petroleum-beds being reached: the boring is not, however, a failure, as the knowledge gained will probably enable a successful boring to be made elsewhere. Mr. Chalmers, in Quebec province, finds evidence of extensive post-tertiary earth-movements in the many narrow lakes and uplifted shore-lines. In Nova Scotia, Prof. Bailey has successfully delimited the Devonian and Silurian formations, but has not been so fortunate with the supposed Cambrian (but unfossiliferous) rocks. Messrs. Barlow and Adams have carried modern methods and ideas into a survey of the classical Laurentian territory, but their work deserves more extensive notice than can now be given. We have also received the mineral statistics for 1895 from the same Survey.

BULLETIN 2, vol. ii. of the Geographical Club of Philadelphia, contains an account of a trip to Manikaland, by Mr. J. E. Farnum. The route followed the course of the Urema, which flows from Sungue Lake and joins the Pungue, about 45 miles above Fontisvilla, the starting-point of the railway to Salisbury. The country here, northwards to the Zambesi, and 150 miles south to the Bosi River, is perfectly flat, with scattered depressions, forming swamps during the greater part of the year. The soil is black sandy loam, supporting long grass, sometimes fifteen feet high, and a few palm trees; and in the drier parts dense tropical forest. Gutta-percha is obtained from one of the few creepers, and sold in small lumps to the Portuguese traders. The people are evidently degenerate, having few or no ceremonies or traditions of any kind.

WE have received Parts 2 and 3 of vol. xx. of the *Transactions and Proceedings* of the Botanical Society of Edinburgh, which give evidence of the continued activity of scientific research in the northern capital. Mr. R. S. McDougall has an elaborate paper on the poisonous properties of some Leguminous plants, especially of *Lathyrus sativus*. Mr. T. Cuthbert Day contributes an article on the germination of barley with restricted moisture, accompanied by a number of tables. In a valuable paper on the pigments of plants, by Miss M. J. Newbigin, the authoress attempts a classification of the colouring matter of flowers, and offers some suggestions with regard to their purpose in the physiology of the plant. But we would venture to suggest to the compilers of this and of some other journals, that the reviewer has scarcely a fair chance of appreciating their value when, as in the present instance, there is no kind of index or table of contents to each separate part, and even no descriptive headline to the pages.

A SERIES of articles upon the botanic gardens of the world is in course of appearance in the *Pharmaceutical Journal*. In the current number of the journal (March 27) an interesting article on the Royal Gardens at Kew is continued.

THE *Comptes rendus* of the meetings of the Congrès international des Pêches Maritimes, held at Sables-d'Olonné in September last, have just been published, as a volume of four hundred pages, by the Institut international de Bibliographie scientifique, Paris.

THE following are the arrangements for lectures on Tuesday evenings, at 8.30, at the Royal Victoria Hall, Waterloo-road S.E.:—April 6, Rev. George Henslow, on "The Movements of Plants"; April 13, Mr. F. W. Rudler, on "Modes of Mountain Making"; April 20, Prof. B. J. Malden, on "Africa up to date"; April 27, Dr. W. B. Benham, on "The Life of an Egg."

THE first number of the *Aeronautical Journal* has made its appearance. It is the organ of the Aeronautical Society of Great Britain, which is now undergoing resuscitation. Interest in flying and flying-machines, and atmospheric exploration, has lately received such a decided impetus, that the Society should have no difficulty in increasing its membership, or in obtaining topics for consideration.

A NEW quarterly magazine, devoted to subjects of general and permanent interest concerning "East Asia," which is the title it will bear, will appear in June. Articles will be contributed to the magazine on the past history and present condition of Eastern Asia; the buildings, institutions, and customs; th races of men; the plants and animals; the religion and literature; and on the voyages and adventures of old travellers. *East Asia* will be conducted by Mr. Henry Faulds, Fenton, Stoke-on-Trent, and published by Messrs. Marshall, Russell, and Co.

WE notice with satisfaction that *The Photogram* is endeavouring to make photographers into investigators, by presenting some of the results obtained by the use of photography. The applications of photography in the technology of explosives, in civil engineering, and in entomology, were dealt with in the first three numbers of this year, and the April number contains several fine illustrations of the effects produced on the surface and within the mass of liquid, when a liquid jet strikes the surface.

THE Association for the Harmonious Development of Faculties, an object which has the sympathy of all, if not the support, has followed up the publication of a sensible little pamphlet on "Common-sense Ethics" by another, on "Confucius: his life and his doctrine" (Williams and Norgate). The great Chinese philosopher used to send away his disciples who did not show sufficient ardour for study, or such as were not sufficiently intelligent to understand him. "When," said he, "I have shown a pupil one corner of the subject, and he is unable to discover the other three, I do not repeat my lesson." Confucius evidently understood the value of self-help.

THE Cheltenham College Natural History Society has issued a report of the proceedings during the year 1896. We welcome this, as we do all similar evidence of interest in science, and of observations made in the true spirit of inquiry. The sections of archæology, botany, entomology, geology, ornithology, and photography have all assisted in increasing the knowledge of the facts of nature, and the lectures, two of which, on "Argon and Helium" and "Cheltenham in the Old Days," appear in the report, have given the members of the Society something to think about. Too great encouragement cannot be given to such natural history societies as that at Cheltenham and other schools.

IF there is any book to which the word indispensable can be applied without being a figure of speech, it is the "Statesman's Year-Book" (Macmillan), the thirty-fourth annual publication of which we are pleased to announce. Under the editorship of Dr. J. Scott Keltie, assisted by Mr. J. P. A. Renwick, the book has become a unique statistical and historical annual of the states of the world. The present issue is a volume of 1167 pages, three hundred of which are devoted to the British Empire, and the remainder to foreign countries. To indicate the political changes which have taken place during the sixty years of Her Majesty's reign, eight pairs of coloured maps have been inserted, exhibiting, side by side, the political divisions of the continents in 1837 and 1897. It need hardly be said that the two maps of Africa, compared in this way, present a very striking difference. Other new features have been introduced, and the whole work stands out as a trustworthy and never-failing book of reference on political and commercial geography.

THE South London Entomological and Natural History Society has for many years cultivated the spirit of scientific observation, and added to the number of workers in the extensive field of natural history. The proceedings of the Society for the year 1896 testify to a condition of well-directed activity and sustained interest in the ways and works of nature. There are many noteworthy papers in the report, and they are made valuable by the fact that they record the results of direct observation. We note with satisfaction that Mr. Robert Adkin, in the course of his presidential address, points out how entomologists may assist in elucidating many problems of biology. He rightly remarks that, "Without entering very far into the philosophical phase of his subject, every practical entomologist has it in his power to contribute something towards solving one or the other of the problems connected with variation, heredity, and the general laws operating in the production of species. He is already expert at rearing insects from the egg'; let him continue to do this, but let him conduct his rearing operations on experimental lines. . . . A useful course of experimental work would be to endeavour to develop some particular varietal tendency exhibited by a species."

THE spring announcements of the Cambridge University Press include :—The Collected Mathematical Papers of the late Arthur Cayley, F.R.S., to be completed in thirteen volumes, vol. xii. ; The Scientific Papers of John Couch Adams, F.R.S., vol. ii , edited by Dr. W. G. Adams and R. A. Sampson ; The Foundations of Geometry, by the Hon. B. Russell ; A Treatise on Abel's Theorem, by H. F. Baker ; The Theory of Groups of a Finite Order, by W. Burnside, F.R.S. ; A Treatise on Universal Algebra, with some applications, by A. N. Whitehead. Vol. i. contains the General Principles of Algebraic Symbolism : The Algebra of Symbolic Logic : The Calculus of Extension (*i.e.* the Algebra of Graffmann's Ausdehnungslehre), with applications to Projective Geometry, to Non-Euclidean Geometry, and to Mathematical Physics ; A Treatise on Octonions : a development of Clifford's Bi-Quaternions, by Prof. Alexander McAulay ; A Treatise on Spherical Astronomy, by Prof. Sir Robert S. Ball, F.R.S. ; A Treatise on Geometrical Optics, by R. A. Herman ; An Elementary Course of Infinitesimal Calculus, for the use of Students of Physics and Engineering, by Prof. Horace Lamb, F.R S. ; Theoretical Mechanics : an introductory Treatise on the Principles of Dynamics, with numerous applications and examples, by A. E. H. Love, F.R.S. ; The Works of Archimedes, edited in modern notation, with introductory chapters, by Dr. T. L. Heath ; Handbook to the Geology of Cambridgeshire, by F. R. Cowper Reed. Cambridge Natural Science Manuals.—(Biological Series) Fossil Plants : a Manual for Students of Botany and Geology, by A. C. Seward ; The Vertebrate Skeleton, by S. H. Reynolds ; Vertebrate Palæontology, by A. S. Woodward ; (Physical Series) Electricity and Magnetism, by R. T. Glazebrook, F.R.S. ; Sound, by J. W. Capstick ; (Cambridge Geographical Series) A History of Ancient Geography, by the Rev. H. F. Tozer, with ten maps.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*, ♂), a Levaillant's Cynictis (*Cynictis penicillata*), a Black-backed Jackal (*Canis mesomelas*) from South Africa, presented by Mr. J. E. Matcham ; a Cheetah (*Cynælurus jubatus*) from Africa, presented by Colonel W. H. Wylde ; a White-bellied Pangolin (*Manis tricuspis*) from Lagos, presented by Mr. F. W. Marshall ; an Alexandrine Parrakeet (*Palæornis alexandri*, ♂) from India, presented by Mrs. Randall ; a Severe Macaw (*Ara severa*) from South America, presented by Mrs. J. Keser ; three Indian Pigmy Geese (*Nettopus coromandelianus*, ♂ ♂ ♀) from India. presented by Mr. Frank Finn ; a Tesselated Snake (*Tropidonotus tesselatus*) from South Europe, presented by Mr. W. R. Temple ; a Natal Python (*Python sebæ*, var) from South Africa, presented by Mr. Luscombe Searelle ; three Purplish Death-Adders (*Pseudechis porphyriacus*), a Shielded Death-Adder (*Notechis scutatus*), three Australian Banded Snakes (*Diemenia nuchalis*), an Occipital Elaps (*Furina occipitalis*) from Australia, deposited ; a Maximilian's Aracari (*Pteroglossus wiedi*) from Brazil ; two Rosy-faced Love-Birds (*Agapornis roseicollis*) from South Africa, purchased ; two Collared Fruit Bats (*Cynonycteris collaris*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE PLANET MARS.—Prof. Schiaparelli has just published an account of his observations of Mars made during the years 1883–84. These observations are contained in the publication of the *Reale Accademia dei Lincei*, 1895–96, and are accompanied by a new chart of the surface-markings and eight diagrams of the planet's disc. Of the thirty-one canals seen to develop in 1881 and 1882, only eighteen have been observed again at this opposition, while seven new ones have been noted. In the polar gap a large dark rift was seen, apparently separating the snow into two unequal portions. An examination of the chart with that published by Lowell will be found to give many interesting points of difference. In the March number of the *Bulletin de la Société Astronomique de France* there will be found a brief account of these observations, with reproductions of the plates in Schiaparelli's original memoir. There are added a series of drawings of the planet observations, made from the Observatory of Juvisy, at the opposition in December last.

Some interesting observations, made of Mars last year, are contributed to the current number of the *Astronomischen Nachrichten* (No. 3411). The observer, Herr Leo Brenner, saw altogether 126 canals, 31 of which were new, while 13 and 82 were Lowell's and Schiaparelli's respectively. He gives, in a table, the positions of these new canals, remarking that he never saw any of the canals doubled. Five new seas were seen by him at positions B = 162° and + 32°, C = 261° and + 36°, D = 270° and + 48°, E = 201° and + 27°, 4 = 215° and + 3°. The sea E had been previously seen by Antoniadi, who thought that it represented a doubling of Trivium. Propontis was seen doubled, the old one lying to the westward. On September 8 the last was seen of the south polar snow, and on the same date the north pole was distinctly observed. Nilosyrtis was bridged over as shown in Schiaparelli's map of the year 1882, but further to the south than is shown there. Several other points of interest were noted. A full account of these will be published in the *Kais. Akademie der Wissenschaft.*

In the same number of the *Astr. Nachr.*, mentioned above, M. V. Cerulli gives a brief account of his observations on Mars, made between October 1896 and January of this year.

DOUBLE-STAR MEASURES.—The *Astronomical Journal* (No. 397) gives the measures of several observers of double-stars. Prof. W. J. Hussey contributes measures of eighty different doubles made with the 12-inch and 36-inch of the Lick Observatory. The Morrison Observatory adds several more, measured by Mr. Henry S. Pritchett with the 12½-inch of that observatory. Mr. W. S. Eichelberger, of the Wesleyan University Observatory, Middletown, also publishes a few measures, but does not state the size of the instrument employed. Several bright objects among the southern stars, which have hitherto been supposed to be single, have now been proved to be double, according to Prof. T. J. J. See (*Astr. Nach.*, No. 3312). Further, several wide pairs have been resolved into triple systems of high interest. Three special cases of the former are mentioned, and as they seem likely to be of interest to other observers, we give the following data :—

ψ *Velorum*, discovered 1897 January 31.
α = 9h. 26m. 46·6s. = − 40° 1′ 50″·5 (1900·0
1897·084. Pos. angle 258°·8. Dist. 0″·54.
Mag. 5 and 5·1. Both yellow.

p *Velorum*, discovered 1897 January 10.
α = 10h. 33m. 6·5s. ∂ = − 47° 42′ 3″·9.
1897·065. Pos. angle 268°·9. Dist. 0″·47.
Mag. 4·6 and 5·2. Both yellow.

λ *Lupi*, discovered 1897 February 1.
α = 15h. 2m. 7·2s. ∂ = − 44° 53′ 31″·5.
1897·085. Pos. angle 178°·6. Dist. 0″·30.
Mag. 4·9 and 5·2. Both yellow.

BELGIUM OBSERVATORY ANNUAL.—The director of the Royal Belgium Observatory brings together in the annual for this year (the sixty-fourth year) a mass of useful information which will be serviceable to meteorologists as well as astronomers. In addition to the usual solar and planetary ephemerides, occultations, &c., Prof. F. Folie has written some short chapters on the following points :—A reaction in astronomy, accurate history of the discovery of diurnal nutation, explanations of the systematic differences between the Greenwich,